

**WHAT IS CLAIMED IS:**

1. A method for fusing an expressed protein with a peptide, said method comprising the steps of:

5 (a) generating at least one C-terminal thioester-tagged target protein;

(b) generating at least one target peptide having a specified N-terminal; and

(c) ligating said target peptide to said target protein.

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2. The method of claim 1, wherein said target protein is generated from a first plasmid comprising an intein having N-terminal cleavage activity.

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3. The method of claim 2, wherein said intein comprises an intein having a cysteine residue at the N-terminal of the intein.

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4. The method of claim 3, wherein said target protein is generated by thiol reagent-induced cleavage of said intein.

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5. The method of claim 4, wherein said thiol reagent is selected from the group consisting of MESNA, thiophenol, DTT,  $\beta$ -mercaptoethanol or derivatives thereof.

6. A fusion protein produced by the method of any one of claims 1-5.

7. A cyclic protein produced by the method of claim 1.
8. A modified intein comprising a mutant Mxe GyrA intein capable of thiol reagent-induced cleavage to produce a thioester at the C-terminal of an adjacent target protein.
9. A method of generating a reactive thioester comprising contacting a thiol reagent selected from the group consisting essentially of MESNA, thiophenol, DTT,  $\beta$ -mercaptoethanol or derivatives thereof with a precursor comprising a target protein and intein.
10. A method for screening thiol reagents which cleave a target intein comprising the steps of:
  - (a) isolating a precursor comprising a protein and a modified intein;
  - (b) contacting a thiol reagent with the precursor of step (a);
  - (c) determining whether a splicing or cleaving event occurs.
11. The method of claim 10, comprising the further step of determining whether the spliced or cleaved product of step (c) can ligate to a target peptide having an N-terminal cytokine.